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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF: RONALD R. FOSTER

APPLICATION No.: 09/826,486

FILED: APRIL 4, 2001

FOR: **INTEGRATED BIOMETRIC SECURITY
SYSTEM**

EXAMINER: AU, SCOTT D.

ART UNIT: 2635

CONF. No: 3004

Appellant's Brief Under 37 C.F.R. § 1.192

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Sir:

I. REAL PARTY IN INTEREST

The real party in interest in the above-identified application is OmniVision Technologies, Inc., a corporation formed under the laws of the state of Delaware and having a current business address of 1341 Orleans Drive, Sunnyvale, California 94089. OmniVision Technologies is the owner of all right, title, and interest in the above-identified application.

II. RELATED APPEALS AND INTERFERENCES

Applicant, applicant's legal representative, and the real party in interest are unaware of any appeal or interference that will directly affect, be directly affected by, or have a bearing on the Board's decision in the present appeal.

III. STATUS OF CLAIMS

Claims 1-9 and 13 are pending and currently stand rejected by the Examiner under the final rejection mailed February 12, 2004. Claims 1-8 stand rejected under 35

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U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,028,773 to Hundt ("Hundt") in view of U.S. Patent No. 6,225,676 to Hattori et al. ("Hattori"). Claim 9 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Hundt in view of Hattori and in further view of U.S. Patent No. 5,606,365 to Maurinus et al. ("Maurinus"). In a Notice of Appeal dated March 18, 2004, appellant appealed from the final decision of the Examiner. The final rejections of claims 1-9 and 13 therefore stand appealed.

IV. STATUS OF AMENDMENTS

There are no amendments pending that have not been entered. A copy of all claims on appeal is provided in Appendix A.

V. SUMMARY OF INVENTION

Applicant's invention relates generally to biometric devices, and more particularly to a biometric security system integrated with a personal appliance such as a cell phone, pager, personal digital assistant ("PDA"), digital camera, or the like, for preventing unauthorized access to the appliance or to information or data contained therein.

The present invention is most clearly shown in Figure 1. The appliance 10 includes a biometric security system 12 integrated with the appliance's standard hardware 14. The appliance 10 may be a cell phone, pager, PDA, digital camera, laptop computer, or other portable, personal electronic appliance. The biometric security system 12 is formed on a single integrated circuit die. In the illustrated embodiment, the biometric security system 12 includes a CMOS image sensor 16 for capturing raw image data of a physiological characteristic (e.g., a fingerprint) of a user and a non-volatile memory 20 for storing a template that identifies the user. The biometric security system 12 further includes a signal processor 18 for extracting a feature set from the raw image data, comparing the feature set to the template stored in the non-volatile memory 20, and then directing the biometric security system 12 to allow access to the appliance's standard hardware 14 if the feature set is substantially the same as the template.

VI. ISSUES PRESENTED FOR REVIEW

The following issues are presented for review:

- A. Whether the Examiner improperly rejected Claims 1-8 and 13 under 35 U.S.C. § 103(a) as an obvious combination of Hundt and Hattori; and;
- B. Whether the Examiner improperly rejected Claim 9 under 35 U.S.C. § 103(a) as an obvious combination of Hundt, Hattori, and Maurinus.

VII. GROUPING OF CLAIMS

For purposes of this appeal, claims 1-9 and 13 all stand together.

VIII. ARGUMENTS

A. The Examiner's Rejections

In the final Office Action, the pending claims were rejected under 35 U.S.C. § 103 as being obvious over Hundt, Hattori, and Maurinus. More specifically, claims 1-8 and 13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hundt in view of Hattori. The Examiner argues that it would have been obvious to combine the plurality of elements found in the appliance integrated biometric security system of Hundt onto a single integrated circuit as taught by Hattori.

Claim 9 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Hundt in view of Hattori and in further view of Maurinus. The Examiner uses the Maurinus reference for the teaching of storing a pixel defect map in a non-volatile memory.

B. Summary of the Cited Prior Art

- 1. Hundt Discloses an Integrated Circuit Package for Direct Mounting of Various Integrated Circuit Dies to a Printed Circuit Board

The Hundt patent teaches "an integrated circuit package for direct mounting" of various chips to form a silicon sensor. (Hundt, Abstract.) The sensor of the Hundt patent is adapted for scanning a fingerprint and acting as a biometric sensor. (Hundt,

col. 3, ln. 13.) Importantly, the Hundt patent provides a "reliable and durable packaging of exposed silicone sensor dies." (Hundt, col. 1, lns. 47-48.) Thus, the Hundt patent teaches a method for efficiently packaging at least three distinct integrated circuit dies: the sensor die, the microprocessor die, and memory die onto a printed circuit board. (Hundt, col. 10, lns. 17-37.)

2. Hattori Discloses a Semiconductor Device Having Circuit Elements Operating at a High Frequency and Isolated From Each Other

The Hattori patent is directed to a semiconductor device that includes circuit elements operating at a high frequency in a stable manner. In particular, Hattori provides a semiconductor device having "a semiconductor layer including a plurality of island regions and a corresponding plurality of isolation regions that surround the respective island regions from each other." (Hattori, col. 1, lns. 38-42.) The island regions include "a circuit capable of performing a predetermined function, and a first capacitor having a first terminal connected to either the substrate portion or the semiconductor layer and a second terminal connected to the ground." (Hattori, col. 1, lns. 43-46.)

3. Maurinus Discloses a Digital Still Camera and Interactive System for Video Display or Reproduction of Captured Images Employing an Image Processing System

The Maurinus patent relates to "a high resolution . . . electronic still image camera for capturing an image as a set of raw, digitized image information corresponding to the pixel intensities of an image capture CCD element array." (Maurinus, col. 4, lns. 32-35.) The camera of Maurinus "is tested during manufacture to determine which of the CCD array photosites of the CCD array . . . are defective. A pixel defect map . . . is created that identifies the defective photosites by row and column number." (Maurinus, col. 5, lns. 32-35.)

C. The Legal Standards for Obviousness Under 35 U.S.C. § 103

To reject claims as being obvious, "the [E]xaminer bears the initial burden of presenting a prima facie case of obviousness." *In re Rijckaert*, 9 F.3d 1531, 1532 (Fed.

Cir. 1993). A *prima facie* case of obviousness "is established when the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art." *Id.* (quoting *In re Bell*, 991 F.2d 781, 782 (Fed. Cir. 1993)). This same standard is echoed in MPEP § 2142, which sets forth three basic criteria that must be met in order for the Examiner to establish a *prima facie* case of obviousness:

1. There must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings;
2. There must be a reasonable expectation of success; and
3. The prior art reference (or references when combined) must teach or suggest all of the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.

MPEP § 2142 (Edition 8, August 2001.) The MPEP goes on to explain that if the references do not "explicitly or impliedly suggest the claimed invention," it is the Examiner's burden to "present a convincing line of reasoning" as to why the modification would have been obvious. *Id.* (quoting *Ex parte Clapp*, 227 U.S.P.Q. 972, 973 (Bd. Pat. App. & Inter. 1985)). This line of reasoning must be more than vague conjecture about possible modifications of the prior art, and must instead be supported by an explanation of the motivation for making such modifications:

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. . . . Although a prior art device "may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so."

MPEP § 2143.01 (Edition 8, August 2001) (quoting *In re Mills*, 916 F.2d 680, 682, 16 U.S.P.Q.2d 1430, 1432 (Fed. Cir. 1990)).

D. The Examiner has Failed to Establish a *Prima Facie* Case of Obviousness by Failing to Provide Any Reason, Suggestion, or Motivation to Combine the Applied References

The Examiner's stated bases for rejection are all predicated on an assumption that it would have been obvious to modify Hundt's system to arrive at the claimed invention. However, the cited references provide no motivation to modify Hundt's design. The present invention represents a meaningful improvement over Hundt's approach and, for the reasons explained below, claims 1-9 and 13 are patentable over the applied references.

1. Hundt Teaches Away from Forming an Integrated Biometric Security System on a Single Integrated Circuit Die

The Hundt patent is precisely the type of prior art that was recognized in the present invention. In the Background section of the present specification, applicant specifically indicated that "present biometrics applications typically consist of several separate integrated circuits." (Specification, 1:23-26.) One of the integrated circuits is dedicated to capturing image data, for example, a CCD image sensor or a CMOS image sensor. This is precisely what is shown in the Hundt patent. For example, Hundt states that a "microcontroller on the back side of the package includes an encrypted form of all of the authorization codes and fingerprint identification data." (Hundt, col. 9, lns. 50-53.)

Hundt further teaches that the

silicon sensor 18 provides a sealed chip-on-board sensor system in one integrated circuit page 10. More particularly, the reverse side 66 of the printed circuitboard 14 includes one or more microchips . . . [and] the top surface 76 can be used for a microprocessor or microcontroller that enables outputting of an image, confirmation or authorization data, and other information to peripheral devices. The microcontroller can include memory for storing fingerprints, security codes, and algorithms for comparisons and verification of fingerprints or other sense data. Memory registers, such as DRAMs or EEPROMs, can be included in the microcontroller to enable programming of additional authorized fingerprints or removal of authorized fingerprints.

(Hundt, col. 10, Ins. 17-37.) Accordingly, it is clear that the system shown in the Hundt patent requires at least two integrated circuits. Other integrated circuits are used for the microcontroller and memory. In no way can it be said that both the memory, microcontroller, or image sensor be formed on a single integrated circuit, as is required in independent claims 1 and 13 of the present application. More specifically, claims 1 and 13 as amended recite that the integrated biometric security system is "formed on a single integrated circuit die." This limitation is not fairly shown in the Hundt patent.

2. One of Ordinary Skill in the Art Would Not be Motivated to Modify Hundt's Device in View of Hattori

The Examiner asserts that even though Hundt does not disclose an integrated biometric security system formed on a single integrated circuit die, one of ordinary skill in the art would be motivated to add this feature to Hundt's device. The Examiner would combine the teachings of Hundt with that of Hattori. The Examiner's only rationale for combining the two references is that:

[i]t would have been obvious to a person of ordinary skill in the art at the time the invention was made to include a plurality of elements mounted on a single chip disclosed by Hattori into the integrated circuit of Hundt with the motivation [being a reduction in] cost and size.

(Examiner's Office Action, February 12, 2004, page 3.)

The Examiner has pointed to no specific teaching in either reference to support this statement regarding the use of "a single integrated circuit die," as taught by the present invention. Rather, the Examiner's rationale for combining the two references is based on a single generic statement from the Background of the Hattori reference which states that "[a] plurality of elements or circuits are mounted in a single chip in order to achieve a higher level of integration, multiple functions, reduced cost, and a reduction in size." (Hattori, col. 1, Ins. 10-15.) This sweeping statement regarding the desirability of "more integration," "lower costs," and "smaller chips" in the microprocessor industry in no way meets the Examiner's burden of "present[ing] a convincing line of reasoning" as to why the modification would have been obvious.

(MPEP § 2142.) Indeed, "[t]he mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch*, 972 F.2d 1260, 1266 (Fed. Cir. 1992) (emphasis added). The Federal Circuit further emphasized this point by stating that:

[a]lthough a prior art device could have been turned upside down, that did not make the modification obvious unless the prior art fairly suggested the desirability of turning the device upside down.

In re Chu, 66 F.3d 262, 298 (Fed. Cir. 1995) (emphasis added).

There is absolutely no incentive, let alone suggestion, to combine these two references. Appellants can find nothing, expressly or impliedly, in the applied references to suggest modifying the integrated biometric security system of Hundt in order to place the system on a single integrated circuit die. To the contrary, the Examiner's rationale appears to be nothing more than a thinly veiled use of impermissible hindsight gleaned from the applicant's specification to provide the desirability of the invention. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 1050-51 (Fed. Cir. 1988). Accordingly, the Examiner's rationale cannot support a *prima facie* case of obviousness. Therefore, the Section 103 rejection of claims 1-8 and 13 should be withdrawn.

The Section 103 rejection of claims 1-8 and 13 based on Hundt and Hattori should be withdrawn for at least one additional reason. The Hattori patent is not directed in any way to the biometric security system field. In fact, the Hattori patent is not even directed to the microelectronic imager field. Rather, the Examiner has simply picked and chosen various elements from the prior art and put them together without any consideration of operability or whether the combination would result in a desirable and operable system biometric security system. Accordingly, for this additional reason the Section 103 rejection of claim 1-8 and 13 should be withdrawn.

2. One of Ordinary Skill in the Art Would Not be Motivated to Modify Hundt's Device in View of Hattori and in Further View of Maurinus

The Examiner relies on Maurinus as teaching the use of a pixel defect map. (Maurinus, col. 5, Ins. 28-35.) The Examiner's only rationale for combining Maurinus with Hundt and Hattori is that:

[i]t would have been obvious to a person of ordinary skill in the art at the time the invention was made to add that the non-volatile memory stores a pixel defect map disclosed by Maurinus into the system of Hundt in view of Hattori with the motivation for doing so [being that] the memory [could] store information relating to the image sensor.

(Examiner's Office Action, February 12, 2004, page 7.)

The Examiner has pointed to no specific teaching in the applied references to support this statement regarding the use of pixel defect map. Instead, the Examiner's rationale for combining the applied references is simply based on the fact that Maurinus includes a pixel defect map. As stated previously, "[t]he mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch*, 972 F.2d 1260, 1266 (Fed. Cir. 1992) (emphasis added). Appellants can find nothing, expressly or impliedly, in the applied references to suggest modifying the integrated biometric security system of Hundt to place the system on a single integrated circuit die and to include a pixel defect map. Once again, the Examiner has simply picked and chosen various elements from the prior art and put them together without any consideration of operability or whether the combination would result in a desirable and operable system biometric security system. The Examiner cannot simply find any reference that includes a pixel defect map and assert that it would have been obvious to combine that reference with Hundt's device.

Accordingly, the current rejection of claim over the combination of Hundt in view of Hattori and Maurinus does not comply with Section 103 because one of ordinary skill

in the art would not be motivated to modify Hundt's device to come up with the claimed features. Therefore, the Section 103 rejection of claim 9 should be withdrawn.

IX. CONCLUSION

Claims 1-9 and 13 have been improperly rejected because the Examiner failed to establish a *prima facie* case of obviousness. More specifically, the Examiner failed to provide (a) prior art references that disclose all of the features of the claims, and (b) a motivation to modify the prior art references to come up with the claimed combination of features. Accordingly, Appellant respectfully requests that the Board reverse the Examiner's rejection of these claims and return the application to the Examiner with instructions to allow pending claims 1-9 and 13.

Respectfully submitted,
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IX. APPENDIX A

Following is a list of the claims involved in this appeal, as amended:

1. An appliance integrated biometric security system comprising:
an electronic appliance; and
an integrated biometric security system formed in a single integrated circuit die
and including a CMOS image sensor, a signal processor, and non-volatile
memory.
2. An appliance integrated biometric security system as defined in claim 1
wherein the signal processor is selected from the group consisting of: a
microprocessor; and a digital signal processor.
3. An appliance integrated biometric security system as defined in claim 1
wherein the non-volatile memory is a programmable read only memory.
4. An appliance integrated biometric security system as defined in claim 1
wherein the electronic appliance is selected from the group consisting of: a cell-phone;
a pager; a personal-digital-assistant; a laptop computer; and a digital camera.
5. An appliance integrated biometric security system as defined in claim 1
wherein the non-volatile memory is selected from the group consisting of: electrically
erasable programmable read only memory; flash memory; and programmable read only
memory.
6. An appliance integrated biometric security system as defined in claim 1
further including an input/output section for programming the non-volatile memory and
for communicating with the electronic appliance.

7. An appliance integrated biometric security system as defined in claim 1 wherein the non-volatile memory is used to store a template that identifies an individual authorized to access the electronic appliance.

8. An appliance integrated biometric security system as defined in claim 1 wherein the non-volatile memory is used to store a plurality of templates, each one of the plurality of templates identifying an individual authorized to access the electronic appliance.

9. An appliance integrated biometric security system as defined in claim 8 wherein the non-volatile memory stores a pixel defect map.

10. (Cancelled)

11. (Cancelled)

12. (Cancelled)

13. An appliance integrated biometric security system comprising:
a portable, personal electronic appliance having functional hardware; and
an integrated biometric security system for authenticating an authorized user of the appliance, said integrated biometric security system formed on a single integrated circuit die and including:
a CMOS image sensor for capturing raw image data of a physiological characteristic of a candidate user;
non-volatile memory for storing a template that identifies the authorized user; and
a microprocessor for extracting a feature set from the raw image data, for comparing the feature set to the template and directing the biometric security system to allow access to the functional

hardware of the appliance if the feature set is substantially the same as the template.